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been omitted without serious loss, yet the research student must examine it in detail, since there occurs from time to time statements such as "This 'heat test,' as it was called, invented and perfected by the late Dr. Dupré, chemical adviser to the home office, is in universal use to-day: it is a test for the purity of guncotton, nitroglycerine and freshly made explosives, and the home office has so far found nothing to supersede it," for from 1896, at least, when P. Gerald Sanford published his "Nitro-Explosives" in London, to 1909, when Dr. H. Kast published his "Anleitung zur chemischen und physikalischen Untersuchung der Spreng- und Zündstoffe" in Brunswick, this stability test has been almost universally styled the Abel heat test, and in view of such governmental publications as that issued from Woolwich, under date of February 11, 1874, it has seemed proper to do so, but of course we must recognize the primary right of the English people to determine questions of priority between their own investigators. They should, however, also resolve the conflicting claims to invention and ownership of modern explosives set forth in these pages by the representatives of private establishments.

As indicated above, the book is a disappointing one and most so in the matter of statistics, for while the rise of an industry in its various phases may be set forth chronologically, the progress is to be measured quantitatively, and yet one searches these pages in vain for the quantities of the explosives of various kinds produced at different periods. It is true that the report of the Nobel's Explosives Company, Limited, shows that, starting in 1871 with a capital of £24,000, it accumulated reserves which were capitalized in 1900 at £800,000, in addition to which debentures to the value of £500,000 were issued, and that, by 1909, it owned nine factories, the chief one known as the Ardeer Factory, occupying 837 acres, containing 1,004 buildings, and employing 2,300 foremen and laborers, together with 35 chemists. Had the editor arranged a system of reporting whereby the other establishments made returns of items similar to these just cited, some measure of progress would have been presented.

In one regard the book is a surprise, for claims to preeminence are set forth in it in no uncertain tones and it may be read with comfort by Americans who are restive under foreign criticism. In fact, in many regards, the book suggests those which may be found in hotels and on routes of travel frequented by commercial travelers.

CHARLES E. MUNROE

*Phrenology or the Doctrine of the Mental Phenomena.* By J. G. SPURZHEIM. Revised edition from the second American edition, published in Boston, 1833. With an introduction by CYRUS ELDER. Philadelphia and London, J. B. Lippincott and Company. 1908.

This is a reprint, without change in the text, except the omission of Spurzheim's reflections upon the moral and religious constitution of man, his voluminous Latin notes and a controversy with George Combe, of the antiquated "phrenology" which sought to define the intellectual and affective powers of the mind, be they perceptive or reflective, propensities or sentiments, in terms of parts that can be distinguished by the external configuration of the head. A frontispiece shows the familiar charts of the head in three views, setting forth with great thoroughness the location of each and all of the powers of the mind. Fourteen plates show portraits of men, bull-dogs and horses, with "readings" of the various "organs" indicating *destructiveness, Amativeness, philoprogenitiveness, inhabitiveness, benevolence, ideality* and so on.

Phrenology has had its day, of even shorter duration than alchemy or astrology, alike empiric and mystic, though it can not be denied that Gall and Spurzheim, particularly the former, did much to prepare the foundation for the rising superstructure of proved facts regarding the brain and mind. Even modern attempts to revert to phrenology and phrenologic methods in localizing the passions and emotions—that is, the subtle moral qualities as distinguished from the intellect—such as the pretentious work of Bernard Holländer have failed signally to convince.

One is curious to know why such an obsolete work was deemed worthy of reprinting at this time and after the lapse of more than sixty years. Cyrus Elder, who writes the introduction, is evidently a layman in matters anatomic and psychologic and therefore doughtily attacks the doctor of medicine and the psychologist as knowing nothing of the mind in the one case and nothing of the brain in the other. Mr. Elder is either innocent of knowledge of, or he ignores the results of, patient researches conducted along clinico-pathologic, experimental, physiologic and developmental lines which have furnished us with a good working map of the somesthetic and sense-areas and, inferentially, of the association-areas of the cerebral cortex. But even such a topographic map, delineating areas called *motor*, *visual*, *auditory* and so on, is not to be considered as mathematically accurate or sharply defined as the areas of a state, county or township. The areas rather shade off in a diffuse manner and really show only the maximum concentration of those cortical parts which most distinctly appertain to the function alleged for them. Also, while less than one third of the cortical expanse is directly concerned with receptive and emissive functions, the remainder is presumed to be devoted to the elaboration of the higher mental activities manifested in abstract thought, ideation, reasoning and language. Further than this, present-day cerebral localization of function in the cortex does not pretend to go. Although an aggregation of psychic areas and therefore the seat of the will, the neuron connections of any portion of the cortex with other cortical parts and of these with other centers in the brain, are so intricate, complex and interdependent that all search for isolated "centers" of moral qualities, qualities of consciousness, has thus far been quite futile. Of the neurone, the developmental, structural and functional unit of the nerve-system, and of the grouping and chaining of neurones as revealed by modern methods of investigation, Gall and Spurzheim knew nothing, of course; apparently the editor of the volume before us is no better off.

With the increase of the intellectual faculties in the course of evolution, the brain has developed in bulk and complexity and with it the skull has undergone expansion and modification of form. Some of the intellectual faculties have found somatic expression in the relative expanse of certain cortical areas and these in turn have exerted some influence upon the configuration of the skull, but not to the degree nor of the same kind of protuberances that Gall and Spurzheim's phrenology proposed; protuberances, by the way, which in certain instances overlie normally variant air-sinuses, blood-sinuses, sutural thickenings or muscle.

Unless it be that a certain historic interest attaches to a work which for a time attracted attention and even afforded disciples of its doctrines a means of livelihood, and which may be regarded as a stepping-stone toward modern cerebral physiology, the reprinting of Spurzheim's work must be regarded as a somewhat otiose undertaking.

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#### SCIENTIFIC JOURNALS AND ARTICLES

*The Journal of Biological Chemistry*, Vol. VI., No. 3, June, 1909, contains "The Mode of Oxidation in the Organism of Phenyl Derivatives of the Fatty Acids": Part IV., Further Studies on the Fate of Phenylpropionic Acid and Some of its Derivatives; Part V., Studies on the Fate of Phenylvaleric Acid and its Derivatives; Part VI., The Fate of Phenylalanine, Phenyl- $\beta$ -alanine, Phenylserine, Phenylglyceric Acids and Phenylacetaldehyde, by H. D. Dakin. These papers are a continuation of the author's earlier work on the mode of catabolism of fatty acids. They show the stages through which the substances studied pass in their transformation in the body and lead to the view that the catabolism of a fatty acid group is effected by the removal of two carbon groups at a time. This process is termed by the author "successive  $\beta$ -oxidation" and is believed to be a general biochemical reaction. "The Nuclein Ferments of Yeast," by M. N.